Enterprise Level Intelligent VMS System

Videonetics Enterprise Level Intelligent Video Management System is a hierarchical, distributed, modularly constructed and well-engineered system for Intelligent Video Surveillance spanning multiple servers. This has been developed specially to keep in mind the scalability, flexibility in deployment, and to adapt to the existing workflow of the organization.

The System is designed to be as under:

![Diagram of VMS Components](image)

**Fig 1: VMS Components**
I. Description of Components

The intelligent VMS has been designed and architected in a modular way so that every service supposed to be rendered by the VMS is independently scalable and supported by distributed failover mechanism. New services can be added to the system in future seamlessly.

(A) Video recording Server (VRS)

VRS is responsible to receive video streams from the cameras for various services including recording the video to storage and streaming the same to other components of the system (e.g., Workstations). There can be multiple VRS in a single system in any site forming a ‘Cluster or Server farm’ of VRS to accomplish various tasks in a cooperative manner. The Cluster appears as single unit to the rest of the system thus giving a modular structure to the total system. Once added, the cameras are automatically distributed across all the active VRS without any human intervention. In case, one or more servers (VRS) fail, the cameras connected to the failed server(s) are distributed amongst the active VRS(s), thus giving a failover support against VRS server failure. Therefore, there is no need for a redundant or backup server. This is a cost saving proposition for the System integrators or the end users. VRS runs on all standard platforms, e.g. Linux, Windows, Mac OS.

(B) Intelligent Video Analytics Server (IVAS)

IVAS is independent but tightly integrated server software for Analytics application. One or more servers can be added to include Video Analytics functionality in the system. There are various suites of Video Analytics applications from Videonetics in its PLUTO series. PLUTO servers are added plug-n-play to the IVMS system. Please refer to PLUTO datasheets from Videonetics for details. IVAS runs on all standard platforms, e.g. Linux, Windows and Mac OS.
(C) Intelligent Video Management Client (IVMC)

IVMC is the main user interface to access IVMS for live view, archive search and configuring the system. It is designed to be a very user friendly and easy to use interface that does not require IT skills to operate. The GUI is very intuitionist and all the major functionalities are always only two mouse clicks away. The same user interface is used for live monitoring, archive search, Analytics events search, user management, log search, etc. Both the VRS and IVAS are configured using the same user interface. Access rights to users are grouped into multiple levels, and the GUI shows only the relevant buttons and menus to any level of user, thus not cluttering the GUI with unnecessary details. IVMC runs on all standard platforms, e.g. Linux, Windows and Mac OS.

Mobile Client (MobC)

Users can access the system using his or her cell phones or tablets for live view and searching the recorded video using various filters. The filters are based on date and time, Analytics applications, criticality levels of Alerts and various combinations of these parameters. Both Android and iOS are supported.

(D) Web Client (WebC)

WebC is the web based user interface to access the system for live view and archive search. It supports all standard browsers rather than forcing the user to use any particular proprietary one. This gives the advantage to the user to access the system over the Internet and from anywhere using his/her own computer- be it a Mac system or a Windows or even Linux.
has unique bandwidth aware streaming technology to support various communication infrastructures at the client end. A special component within the VMS software (named ‘Intelligent VMS interface’ or VMI) controls the resolution and bit rate of the video intelligently while streaming to Web based clients.

**Intelligent VMS Interface (IVMI)**

VMS CORE comes with Videonetics unique Intelligent VMS Interface which is the sole secured interface to communicate with external device (ACS, PIDS, Fire, etc) . External device drivers can be plugged in to IVMI for integration of the devices into VMS.

IVMI is also responsible for intra-VMS communication, when there are geographically separated unified system are in need.

**II. Unique Features of VMS CORE**

**(A) Intuitionist Instant Playback:**

a. No explicit menu driven search is required
b. Video database Cache - intuitionist intelligence
c. Instant actions from any coordinate point in the view
d. User can instantly switch to Playback mode from the live view mode and vice versa for any camera in any tile in a multi-tile window.

**2. Instant Video Lock-step**

a. Replay in Lock-Step mode - You pick up the timestamp of one view and choose to synchronously replay other cameras using the same timestamp by simple “Copy-Paste” operation.

b. Dynamic reconfiguration – User simply select required views from the screen

**3. Bandwidth Aware Streaming:**

a. Embedded load-balancing for bandwidth aware video streaming facility
b. QoS maximized streaming, especially in fluctuating bandwidth situation
c. Automated, no user interaction or manual operation required
4. Intelligent System Health Check:
   
a. Services rendered by all the major system components are automatically probed periodically by the System health checker in-built into Videonetics iVMS Software.
   
b. The health log is saved in database so that this crucial data can be searched against various criteria to detect Camera faults, Network disconnection errors, storage status, etc.
   
c. SMS or other Alerts are sent on component failure.

5. Intelligent Storage Management:
   
a. **Local HDD support:** Local Hard Disk Drives are used to store video data stream from the cameras. The administrator can set the limit on how much storage space for each of the available drives can be used by the system for this purpose.
   
b. **Record deletion:** User can select deletion of video clips from the storage in following two modes:
   
   i. **First-In-First-Out (FIFO) Mode:** In this mode, the archived video clips are deleted on FIFO basis. FIFO means, the oldest records will be deleted automatically as the system encounter a shortage of storage space.
   
   ii. **Retention Period Mode:** In this mode, the archived video clips will never be deleted automatically from the storage. Once the storage reaches to a certain percentage level (user defined), the system will generate alert well ahead to inform the user that the storage is reaching to its full capacity. Once the storage reaches to its full capacity, further recording will be stopped till the storage is freed, or the records are aged in the storage beyond a user specified ‘Retention period’.
   
c. **Recording Configuration:** User can configure as many Recording Schedules as desired:
   
a. Automatic Motion-based recording
   
b. Configuration of Recording Patterns
   
c. Auto-Activate recording on Special Dates
   
d. Auto-Activate recording on special schedules
   
e. Auto-Activate recording on certain special dates with special schedules
Examples of Benefits of Configuration:

**Example 1:** If Motion Triggers are available from the cameras, then “Motion activated recording” can also be set for any camera using simple English type of rules such as “Record video from camera from 6:00 pm to 6:00 am only on detection of Motion”.

**Example 2:** User can configure the schedule of selected cameras as “Weekdays Only.” This will automatically archive video from selected cameras only on Weekdays and there will be no recording on Saturday and Sundays.

**Example 3:** Some of the cameras can be configured to schedule as “Weekends only.” These cameras will automatically archive video clips from these selected cameras on Saturdays and Sundays only.

**Example 4:** User can configure the recording hour-wise for each day of the week separately.

**Example 5:** User can configure “Special Dates (SPL).” This enables to include some specific dates as “Special Days (SPL)”, for which specific recording patterns (hour-wise) can be configured.

These are few examples. Once the Recording Schedules are configured, one can assign any particular Schedule to any given camera or to a group of cameras or to the cameras which are co-located.

6. **Redundant Recording:** Selected cameras can be set to Redundant recording mode, where the video from the cameras are recorded in a separate storage over and above the regular recording which happens as per the schedule set.

7. **Video Cart:** The unique and convenient Video Cart facility enables the users to download multiple clips is a single folder with user comments.

8. **Intelligent Video Analytics Framework:**
   (a) The Intelligent VMS is monolithically integrated with Intelligent Video Analytics Framework.
   (b) VMS framework and VA framework are homogenous, same design philosophy, easy to maintain.
(c) Event hotspot: Any video tile in Matrix view can be set as “Event Hotspot” to show the video of the camera whenever Video Analytics Event is detected.

9. Operator Action Programming:
   a. Actions to be performed by an operator when operator views the Alert messages can also be preprogrammed
   b. Action statement(s) is displayed along with the Alert message on the Operator Panel.
   c. Easy escalation matrix framework to communicate with higher level users if requisite actions are not taken by the operators on viewing Alert messages.

10. Text driven video replay
   a. Intuitionist on-the field Alerts Generation
   b. An operator can generate an Alert from the operator panel manually to draw attention of other operators/supervisor on watching any incidence.
   c. Operate can describe the on-line event by text insertion
   d. Text to Video Clip mapping and association

11. High Resolution Snap recording:
   a. Recorded Video is studded with high resolution images for forensic analysis
   b. Enables the user to see a clearer image of the scene when any suspected activities are noticed while replaying archived video.

12. Speed watch framework ready:
   a) Videonetics Speed watch utility enables the user to see the activities in the scene happened in a span of 1 hour in a few minutes (Separate Licensing Scheme Applicable).
   b) A unique tool for forensic analysis where users do not have to replay the video for hours

13. Third Party Device Integration
   a. VMS CORE comes with extensive framework support to integrate third party devices like Access Control System, Fire Alarms, Boom Barrier system etc.
III. System requirements

(A) Server:
Quad Core Xeon, 4GB RAM, 500GB HDD : 64/72 Cameras per Server

(B) Workstation:
Intel i3 processor, 2GB RAM, 500GB HDD, 1 Gbps NIC, HD Graphics Card with Min 2GB.

(C) Operating System*:
   i. Linux: Ubuntu 10.04, 12.04, CentOS, SuSe (10.4 or higher)
   iii. Mac OS: Mountain Lion

* Servers and Workstations are allowed to have different Operating systems